Toll-like receptors

Toll-like receptors, TLR in short, are pattern recognition receptors which play an essential role in the initiation of innate immune response by detecting potential pathogenic threat. In mammals, the number of TLR's differs between species. Humans have 10 TLRs whereas mice have 12 TLRs. They are specialised in the recognition of conserved molecular fragments in bacteria, viruses, fungi and parasites.

As you can see in the figure below, each TLR has a large range of targets. TLRs are made up of an extracellular domain involved in the recognition of the microbial matter and a cytoplasmic tail that mobilises different signalling molecules that will in turn activate the transcription of genes involved in inflammation and in anti-microbial functions.

Each TLR tailors the immune response to the microorganism that they sense. TLR stimulation induces both pro-inflammatory and anti-inflammatory cytokines which will shape the T-cell response. Also TLR signalling is really important in increasing antigen uptake and display.